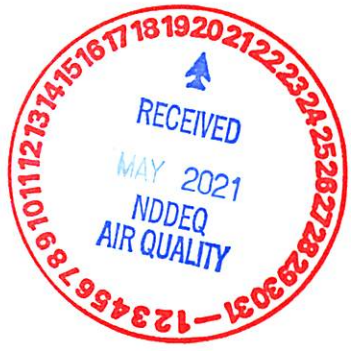
Northern Border Pipeline Company

May 19, 2021 FedEx No. 8136 7919 8703



North Dakota Department of Environmental Quality
Division of Air Quality
918 East Divide Avenue 2nd Floor
Bismarck, North Dakota 58501 – 1947

RE: Glen Ullin Compressor Station – Morton County T5-O93003
Title V Renewal Application

Dear Sir or Madam:

Enclosed please find Attachment 1, a Title V renewal application for Northern Border Pipeline Company (Northern Border) Glen Ullin Compressor Station (previously known as Compressor Station No. 6). Attachment 2 shows the site potential-to emit calculations for both criteria and greenhouse gas pollutants. There are two changes from the previous submittal. The heat content of the natural gas has increased from 1061 Btu/Scf to 1100 Btu/Scf. (The new gas composition is attached as Attachment 3.) In the past, changes in the Btu content of the gas changed the emissions. A closer reading of AP-42 indicates that changes in Btu content from 1020 Btu/Scf (the default value in AP-42) should adjust the site emission factor accordingly. This change results in a slight increase in boiler emissions. The greenhouse gas factors have been updated based on 40 CFR Part 98. There are no known new applicable requirements for this facility since the last submittal.

Northern Border is requesting the following change:

1. The facility name should change from Compressor Station No. 6 to Glen Ullin Compressor Station.

For all questions, please contact me at (402) 639-2785.

Sincerely,

Ruth Jensen
Environmental Analyst

Cc: Compressor Station No. 6 (Section 2)

Air Programs (8P-AR) FedEx No. 8136 7919 8769
Office of Partnerships & Regulatory Assistance
U.S. EPA, Region 8
1595 Wynkoop Street
Denver, CO 80202-1129

Attachment 1

TITLE V PERMIT TO OPERATE - RENEWAL APPLICATION

NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
SFN 52824 (3-2019)

In accordance with 33.1-15-14-04.c. of the North Dakota Air Pollution Control Rules, a Title V permit renewal application must be submitted to the Department at least six months, but no more than eighteen months, prior to the expiration date. Permit renewal applications are incomplete unless all information requested herein is supplied. The current Title V permit will be the baseline reference for this renewal. The requirements (40 CFR 70.5(c) & NDAC 33.1-15-14-06.4.c) to include a citation and description of all applicable requirements and a description of or reference to any applicable test method for determining compliance with each applicable requirement may be met by accomplishing either or both of the following: 1) enclose an annotated (red-lined) copy of the current permit indicating all changes needed to reflect the current facility configuration, applicable requirements and test methods; 2) enclose a narrative that conveys all changes needed to the current permit to reflect the current facility configuration, all applicable requirements and test methods.

FOR ACID RAIN UNITS ONLY – Submit with the Title V permit renewal application all Acid Rain renewal applications (the Acid Rain Permit Application, the Phase II NO_x Compliance Plan, and if applicable, the Phase II NO_x Averaging Plan).

PART 1. GENERAL APPLICATION INFORMATION

Owner's Name: Northern Border Pipeline Company

Facility Name: Glen Ullin Compressor Station (Previously Compressor Station No. 6)

Name of Person Completing Application: Ruth Jensen Phone: 402-639-2785

Title: Environmental Analyst Email: ruth_jensen@tcenergy.com

Current Operating Permit Number: T5-O93003

Expiration Date of Current Operating Permit: 12 / 31 / 2021

PART 2. COMPLIANCE CERTIFICATION

A. Schedule for Submission of Compliance Certifications During the Term of the Permit

Frequency of Submittal	Date Beginning (month/day/year)
Annual	2/14/2017

B. Statement of Compliance with Compliance Assurance Monitoring (CAM) and Compliance Certification Requirements

The facility identified in this application is in compliance with applicable monitoring and compliance certification requirements.

- ☐ Yes
- ☐ No - Describe below which requirements are not being met:
- ☑ CAM not applicable

C. Certification of Compliance with all Applicable Requirements

This certification must be signed by a "responsible official" as defined in NDAC 33.1-15-14-06.1. Forms without a signed certification will be returned as incomplete.

Except for requirements identified in Compliance Schedule and Plan (Section G) of Title V Permit to Operate application forms for which compliance is not achieved, I hereby certify that, based on information and belief formed after reasonable inquiry, the air contaminant source identified in this form is in compliance with all applicable requirements.

Signed	Date 5/19/2021
Typed Name Rick Duncan	

PART 3. STATUS OF SOURCE

Has there been any change to the source since the most recent initial or renewal permit application, minor permit modification, significant modification or administrative permit amendment?

☑ No ☐ Yes

If yes, complete and submit appropriate sections of Title V Permit to Operate application forms.

PART 4. CERTIFICATION OF TRUTH, ACCURACY AND COMPLETENESS

Note: This certification must be signed by a "responsible official" as defined in NDAC 33.1-15-14-06.1. Applications without a signed certification will be returned as incomplete.

I certify under penalty of law that, based on information and belief formed after reasonable inquiry, the statements and information contained in this application are true, accurate and complete.

Name (typed) Rick Duncan

(Signed) _____ Date 05 / 19 / 2021

Telephone Number 402-492-7455

Send original renewal application to:

North Dakota Department of Environmental Quality
Division of Air Quality
918 E Divide Avenue, 2nd Floor
Bismarck, ND 58501-1947
(701)328-5203

Send copy of renewal application to:

Air Program (8P-AR)
Office of Partnerships & Regulatory Assistance
US EPA Region 8
1595 Wynkoop Street
Denver, CO 80202-1129

Attachment 2

Northern Border Pipeline Company
Compressor Station No. 6 (Glen Ullin, North Dakota)
Permit No. T5-O93003
Title V Renewal Application
Site Criteria Pollutant Potential-To-Emit Summary

Site Criteria Pollutant Emission Summary										
Unit	NOX (lb/hr)	NOX (tpy)	CO (lb/hr)	CO (tpy)	VOC (lb/hr)	VOC (tpy)	PM10 (lb/hr)	PM10 (tpy)	SO2 (lb/hr)	SO2 (tpy)
CE1	*	234.18	22.40	98.11	3.00	13.14	2.09	9.16	2.09	9.14
EG1	11.96	2.99	20.13	5.03	0.16	0.04	0.11	0.03	0.003	0.0008
HE2	0.13	0.57	0.11	0.48	0.01	0.03	0.01	0.04	0.001	0.003
TOTAL		**237.75**		**103.63**		**13.21**		**9.23**		**9.14**

Northern Border Pipeline Company
Compressor Station No. 6 (Glen Ullin, North Dakota)
Permit No. T5-O93003
Title V Renewal Application
Site Hazardous Air Pollutant Potential-To-Emit Summary

Pollutant	CAS Number	CE1 (ton/yr)	EG1 (ton/yr)	HE2 (ton/yr)	Total (ton/yr)
Acenaphthene	83-32-9	-	-	1.03E-08	**1.03E-08**
Acenaphthylene	208-96-8	-	-	1.03E-08	**1.03E-08**
Acetaldehyde	75-07-0	5.55E-02	3.77E-03	-	**5.93E-02**
Acrolein	107-02-8	8.89E-03	3.56E-03	-	**1.24E-02**
Anthracene	120-12-7	-	-	1.38E-08	**1.38E-08**
Arsenic	7440-38-2	-	-	1.15E-06	**1.15E-06**
Benzene	71-43-2	1.67E-02	2.14E-03	1.20E-05	**1.88E-02**
Benzo(a)anthracene	56-55-3	4.17E-03	-	1.03E-08	**4.17E-03**
Benzo(a)pyrene	50-32-8	-	-	6.88E-09	**6.88E-09**
Benzo(b)fluoranthene	205-99-2	-	-	1.03E-08	**1.03E-08**
Benzo(e)pyrene	192-97-2	-	-	-	**-**
Benzo(g,h,i)perylene	191-24-2	-	-	6.88E-09	**6.88E-09**
Benzo(k)fluoranthene	207-08-9	-	-	1.03E-08	**1.03E-08**
Beryllium	7440-41-7	-	-	6.88E-08	**6.88E-08**
Biphenyl	92-52-4	-	-	-	**-**
1,3-Butadiene	106-99-0	5.97E-04	8.97E-04	-	**1.49E-03**
Cadmium	7440-43-9	9.61E-03	-	6.31E-06	**9.61E-03**
Carbon Tetrachloride	56-23-5	-	2.39E-05	-	**2.39E-05**
Chlorobenzene	108-90-7	-	1.74E-05	-	**1.74E-05**
Chloroform	67-66-3	-	1.85E-05	-	**1.85E-05**
Chromium	7440-47-3	1.83E-02	-	8.03E-06	**1.83E-02**
Chrysene	218-01-9	-	-	1.03E-08	**1.03E-08**
Cobalt	7440-48-4	-	-	4.82E-07	**4.82E-07**
Dibenzo(a,h)anthracene	53-70-3	-	-	6.88E-09	**0.00**
Dichlorobenzene	106-46-7	-	-	6.88E-06	**6.88E-06**
7,12-Dimethylbenz(a)anthracene	57-97-6	-	-	9.18E-08	**9.18E-08**
1,3-Dichloropropene	542-75-6	-	1.72E-05	-	**1.72E-05**
Ethylbenzene	100-41-4	4.44E-02	3.35E-05	-	**4.45E-02**
Ethylene Dibromide	106-93-4	-	2.88E-05	-	**2.88E-05**
Fluoranthene	206-44-0	1.67E-03	-	1.72E-08	**1.67E-03**
Fluorene	86-73-7	-	-	1.61E-08	**1.61E-08**
Formaldehyde	50-00-0	9.86E-01	2.77E-02	4.30E-04	**1.01E+00**
Indeno(1,2,3-c,d)pyrene	193-39-5	-	-	1.03E-08	**1.03E-08**
Manganese	7439-96-5	1.11E-01	-	2.18E-06	**1.11E-01**
Mercury	7439-97-6	9.21E-03	-	1.49E-06	**9.21E-03**
Methanol	67-56-1	-	4.14E-03	-	**4.14E-03**
Methylene Chloride	75-09-2	-	5.57E-05	-	**5.57E-05**
2-Methylnaphthalene	91-57-6	-	-	1.38E-07	**1.38E-07**
3-Methylchloranthrene	56-49-5	-	-	1.03E-08	**1.03E-08**
n-Hexane	110-54-3	-	-	1.03E-02	**1.03E-02**
Naphthalene	91-20-3	1.80E-03	1.31E-04	3.50E-06	**1.94E-03**
Nickel	7440-02-0	1.60E-01	-	1.20E-05	**1.60E-01**
PAH	NA	3.05E-03	1.91E-04	-	**3.25E-03**
Phenanthrene	85-01-8	-	-	9.75E-08	**9.75E-08**
Phenol	108-95-2	1.76E-02	-	-	**1.76E-02**
Propylene	115-07-1	-	-	-	**-**
Pyrene	129-00-0	-	-	2.87E-08	**2.87E-08**
Perylene	198-55-0	-	-	-	**-**
Propylene Oxide	198-55-0	4.03E-02	-	-	**4.03E-02**
Selenium	7782-49-2	-	-	1.38E-07	**1.38E-07**
Styrene	100-42-5	-	1.61E-05	-	**1.61E-05**
Toluene	108-88-3	1.80E-01	7.55E-04	1.95E-05	**1.81E-01**
Tetrachloroethane	79-34-5	-	-	-	**-**
1,1,2,2-Tetrachloroethane	79-34-5	-	3.42E-05	-	**3.42E-05**
1,1,2-Trichloroethane	79-00-5	-	2.07E-05	-	**2.07E-05**
2,2,4-Trimethylpentane	540-84-1	-	-	-	**-**
Vinyl Chloride	75-01-4	-	9.71E-06	-	**9.71E-06**
Xylene	108-38-3	8.89E-02	2.64E-04	-	**8.91E-02**
Total		**1.758**	**0.0438**	**0.0108**	**1.81**

Northern Border Pipeline Company
Compressor Station No. 6 (Glen Ullin, North Dakota)
Permit No. T5-O93003
Title V Renewal Application
CE1 Criteria and Hazardous Air Pollutant Calculations

Emission Unit ID: CE1
Description: Cooper-Rolls Coberra 6562-DLE Compressor Turbine
Rating: 38,000 horsepower (ISO)
Max. Heat Input: 317 million British thermal units per hour (MMBtu/hr)
Fuel Type: Natural Gas
Controls: Dry low NOx combustion
Wt% Sulfur: 0.007 2.0 grains per 100 scf = 0.007 Weight Percent
Conversion: 2,000 lb/ton
Conversion: 8,760 hours per year
650 hours per year non-DLE
8,110 hours per year DLE

Pollutant	Emission Factor	Emission Factor Units	Emissions (lb/hr)	Emissions (ton/yr)
NOx (DLE)	51.5	lb/hr	51.5	209
NOx (non-DLE)	78.0	lb/hr	78.0	25
CO	22.4	lb/hr	22.4	98
VOC	3.0	lb/hr	3.0	13
PM10	0.0066	lb/MMBtu	2.1	9.2
SO2	0.0066	lb/MMBtu	2.1	9.1
HAP[a]				
Acetaldehyde	4.00E-05	lb/MMBtu	1.27E-02	5.55E-02
Acrolein	6.40E-06	lb/MMBtu	2.03E-03	8.89E-03
Benzene	1.20E-05	lb/MMBtu	3.80E-03	1.67E-02
Benzo(a)anthracene	3.00E-06	lb/MMBtu	9.51E-04	4.17E-03
1,3-Butadiene	4.30E-07	lb/MMBtu	1.36E-04	5.97E-04
Cadmium	6.92E-06	lb/MMBtu	2.19E-03	9.61E-03
Chromium	1.32E-05	lb/MMBtu	4.18E-03	1.83E-02
Ethylbenzene	3.20E-05	lb/MMBtu	1.01E-02	4.44E-02
Fluoranthene	1.20E-06	lb/MMBtu	3.80E-04	1.67E-03
Formaldehyde	7.10E-04	lb/MMBtu	2.25E-01	9.86E-01
Manganese	8.02E-05	lb/MMBtu	2.54E-02	1.11E-01
Mercury	6.63E-06	lb/MMBtu	2.10E-03	9.21E-03
Naphthalene	1.30E-06	lb/MMBtu	4.12E-04	1.80E-03
Nickel	1.15E-04	lb/MMBtu	3.65E-02	1.60E-01
Phenol	1.27E-05	lb/MMBtu	4.03E-03	1.76E-02
PAH	2.20E-06	lb/MMBtu	6.97E-04	3.05E-03
Propylene Oxide	2.90E-05	lb/MMBtu	9.19E-03	4.03E-02
Toluene	1.30E-04	lb/MMBtu	4.12E-02	1.80E-01
Xylene	6.40E-05	lb/MMBtu	2.03E-02	8.89E-02
Total HAP	**0.001266**		**0.40**	**1.758**

NOx, CO and VOC factors are based on manufacturer's data.
SO2 and PM10 emission factors are based on AP-42, Table 3.1-2a (April 2000).
(PM10 factor has been updated from previous application.)

[a] HAP emission factors based on AP-42, Table 3.1-3 (April 2000) for natural gas-fired turbines and EPA FIRE Database (Version 6.23).

Example calculations:

NOx ton/yr: (51.5 lb/hr) * (8,110 hr/yr) / (2,000 lb/ton) = 209 ton/yr NOx
CO ton/yr: (22.4 lb/hr) * (8,760 hr/yr) / (2,000 lb/ton) = 98 ton/yr CO
VOC ton/yr: (3.0 lb/hr) * (8,760 hr/yr) / (2,000 lb/ton) = 13 ton/yr VOC
PM10 lb/hr: (0.0066 lb/MMBtu) * (317 MMBtu/hr) = 2.1 lb/hr PM10
PM10 ton/yr: (2.1 lb/hr) * (8,760 hr/yr) / (2,000 lb/ton) = 9.2 ton/yr PM10
SO2 lb/MMBtu: (0.0070 wt% S) * (0.94) = 0.0066 lb/MMBtu SO2
SO2 lb/hr: (0.007 lb/MMBtu) * (317 MMBtu/hr) = 2.1 lb/hr SO2
SO2 ton/yr: (2.1 lb/hr) * (8,760 hr/yr) / (2,000 lb/ton) = 9.1 ton/yr SO2
Acrolein lb/hr: (0.0000064 lb/MMBtu) * (317 MMBtu/hr) = 0.002 lb/hr Acrolein
Acrolein ton/yr: (0.002 lb/hr) * (8,760 hr/yr) / (2,000 lb/ton) = 0.01 ton/yr Acrolein

Northern Border Pipeline Company
Compressor Station No. 6 (Glen Ullin, North Dakota)
Permit No. T5-O93003
Title V Renewal Application
EG1 Criteria Pollutant Calculations

Emission Unit ID: EG1
Description: Caterpillar G3412 SITA
Rating: 448 kilowatts (kW)
Rating: 600 horsepower
Heat Input: 5.41 million British thermal units per hour (MMBtu/hr)
Fuel Type: Natural Gas
Controls: None
Conversion: 2,000 lb/ton
Conversion: 500 hours per year

Pollutant	Emission Factor	Emission Factor Units	(lb/hr)	(ton/yr)
NOx	2.21	lb/MMBtu	12.0	2.99
CO	3.720	lb/MMBtu	20.1	5.03
VOC	2.96E-02	lb/MMBtu	0.16	0.04
PM10	1.94E-02	lb/MMBtu	0.105	0.03
SO2	5.88E-04	lb/MMBtu	0.003	0.0008

Note: The criteria pollutant emission factors are based on AP-42, Table 3.2-3 (July 2000). The PM10 emission factor includes filterable plus condensable PM.

Example calculations:

NOx lb/hr: (5.41 MMBtu/hr) * (2.21 lb/MMBtu) = 11.96 lb/hr NOx
NOx ton/yr: (12.0 lb/hr) * (500 hr/yr) / (2,000 lb/ton) = 2.99 ton/yr NOx
CO lb/hr: (5.41 MMBtu/hr) * (3.720 lb/MMBtu) = 20.13 lb/hr CO
CO ton/yr: (20.13 lb/hr) * (500 hr/yr) / (2,000 lb/ton) = 5.03 ton/yr CO
VOC lb/hr: (5.41 MMBtu/hr) * (0.030 lb/MMBtu) = 0.16 lb/hr VOC
VOC ton/yr: (0.16 lb/hr) * (500 hr/yr) / (2,000 lb/ton) = 0.04 ton/yr VOC
PM10 lb/hr: (5.41 MMBtu/hr) * (0.0194 lb/MMBtu) = 0.11 lb/hr PM10
PM10 ton/yr: (0.11 lb/hr) * (500 hr/yr) / (2,000 lb/ton) = 0.03 ton/yr PM10
SO2 lb/hr: (5.41 MMBtu/hr) * (0.0006 lb/MMBtu) = 0.003 lb/hr SO2
SO2 ton/yr: (0.003 lb/hr) * (500 hr/yr) / (2,000 lb/ton) = 0.0008 ton/yr SO2

Northern Border Pipeline Company
Compressor Station No. 6 (Glen Ullin, North Dakota)
Permit No. T5-O93003
Title V Renewal Application
EG1 Hazardous Air Pollutant Calculations

Emission Unit ID: EG1
Description: Caterpillar G3412 SITA
Rating: 448 kilowatts (kW)
Rating: 600 horsepower
Heat Input: 5.41 million British thermal units per hour (MMBtu/hr)
Fuel Type: Natural Gas
Controls: None
Conversion: 2,000 lb/ton
Conversion: 500 hours per year

Pollutant	CAS Number	Emission Factor	Emission Factor Units	Emissions (lb/hr)	Emissions (ton/yr)
Acenaphthene	83-32-9	-	-	-	-
Acenaphthylene	208-96-8	-	-	-	-
Acetaldehyde	75-07-0	2.79E-03	lb/MMBtu	1.51E-02	3.77E-03
Acrolein	107-02-8	2.63E-03	lb/MMBtu	1.42E-02	3.56E-03
Anthracene	120-12-7	-	-	-	-
Arsenic	7440-38-2	-	-	-	-
Benzene	71-43-2	1.58E-03	lb/MMBtu	8.55E-03	2.14E-03
Benzo(a)anthracene	56-55-3	-	-	-	-
Benzo(a)pyrene	50-32-8	-	-	-	-
Benzo(b)fluoranthene	205-99-2	-	-	-	-
Benzo(e)pyrene	192-97-2	-	-	-	-
Benzo(g,h,i)perylene	191-24-2	-	-	-	-
Benzo(k)fluoranthene	207-08-9	-	-	-	-
Beryllium	7440-41-7	-	-	-	-
Biphenyl	92-52-4	-	-	-	-
1,3-Butadiene	106-99-0	6.63E-04	lb/MMBtu	3.59E-03	8.97E-04
Cadmium	7440-43-9	-	-	-	-
Carbon Tetrachloride	56-23-5	1.77E-05	lb/MMBtu	9.58E-05	2.39E-05
Chlorobenzene	108-90-7	1.29E-05	lb/MMBtu	6.98E-05	1.74E-05
Chloroform	67-66-3	1.37E-05	lb/MMBtu	7.41E-05	1.85E-05
Chromium	7440-47-3	-	-	-	-
Chrysene	218-01-9	-	-	-	-
Cobalt	7440-48-4	-	-	-	-
1,3-Dichloropropene	53-70-3	1.27E-05	lb/MMBtu	6.87E-05	1.72E-05
Dibenzo(a,h)anthracene	106-46-7	-	-	-	-
Dichlorobenzene	57-97-6	-	-	-	-
7,12-Dimethylbenz(a)anthracene	542-75-6	-	-	-	-
Ethylbenzene	100-41-4	2.48E-05	lb/MMBtu	1.34E-04	3.35E-05
Ethylene Dibromide	106-93-4	2.13E-05	lb/MMBtu	1.15E-04	2.88E-05
Fluoranthene	206-44-0	-	-	-	-
Fluorene	86-73-7	-	-	-	-
Formaldehyde	50-00-0	2.05E-02	lb/MMBtu	1.11E-01	2.77E-02
Indeno(1,2,3-c,d)pyrene	193-39-5	-	-	-	-
Manganese	7439-96-5	-	-	-	-
Mercury	7439-97-6	-	-	-	-
Methanol	67-56-1	3.06E-03	lb/MMBtu	1.66E-02	4.14E-03
Methylene Chloride	75-09-2	4.12E-05	lb/MMBtu	2.23E-04	5.57E-05
2-Methylnaphthalene	91-57-6	-	-	-	-
3-Methylchloranthrene	56-49-5	-	-	-	-
n-Hexane	110-54-3	-	-	-	-
Naphthalene	91-20-3	9.71E-05	lb/MMBtu	5.25E-04	1.31E-04
Nickel	7440-02-0	-	-	-	-
Phenol	108-95-2	-	-	-	-
PAH	85-01-8	1.41E-04	lb/MMBtu	7.63E-04	1.91E-04
Perylene	108-95-2	-	-	-	-
Phenanthrene	115-07-1	-	-	-	-
Propylene	129-00-0	-	-	-	-
Propylene Oxide	198-55-0	-	-	-	-
Pyrene	198-55-0	-	-	-	-
Selenium	7782-49-2	-	-	-	-
Styrene	100-42-5	1.19E-05	lb/MMBtu	6.44E-05	1.61E-05
Toluene	108-88-3	5.58E-04	lb/MMBtu	3.02E-03	7.55E-04
Tetrachloroethane	79-34-5	-	-	-	-
1,1,2,2-Tetrachloroethane	79-34-5	2.53E-05	lb/MMBtu	1.37E-04	3.42E-05
1,1,2-Trichloroethane	79-00-5	1.53E-05	lb/MMBtu	8.28E-05	2.07E-05
2,2,4-Trimethylpentane	540-84-1	-	-	-	-
Vinyl Chloride	75-01-4	7.18E-06	lb/MMBtu	3.88E-05	9.71E-06
Xylene	108-38-3	1.95E-04	lb/MMBtu	1.05E-03	2.64E-04
Total HAPs				**0.18**	**0.0438**

The emission factors are based on AP-42, *Uncontrolled Emission Factors for 4-Stroke Rich Burn Engines*, Table 3.2-3 (July 2000).

Example calculations:

Acetaldehyde lb/hr: (0.00279 lb/MMBtu) * (5.41 MMBtu/hr) = 0.02 lb/hr Acetaldehyde

Acetaldehyde ton/yr: (0.02 lb/hr) * (500 hr/yr) / (2,000 lb/ton) = 0.004 ton/yr Acetaldehyde

Northern Border Pipeline Company
Compressor Station No. 6 (Glen Ullin, North Dakota)
Permit No. T5-O93003
Title V Renewal Application
HE2 Criteria Pollutant Calculations

Emission Unit ID:	HE2 (HE2 is an insignificant activity.)	
Description:	Hydronic Boiler	
Max. Heat Input:	1.336	million British thermal units per hour (MMBtu/hr)
Heating Value:	1,099.78	British thermal units per standard cubic foot (Btu/scf)
Fuel Usage:	0.0012	million standard cubic feet per hour (MMscf/hr)
Fuel Type:	Natural Gas	
Controls:	None	
Conversion:	2,000	lb/ton
Conversion:	8,760	hours per year

Pollutant	AP-42 Emission Factor lb/MMscf	Site Emission Factor lb/MMscf	(lb/hr)	(ton/yr)
NOx	100.0	107.8	0.13	0.57
CO	84.0	90.6	0.11	0.48
VOC	5.5	5.9	0.01	0.03
PM10	7.6	8.2	0.01	0.04
SO2	0.6	0.6	0.00	0.003

The emission factors are based on AP-42, *Emission Factors for Criteria Pollutant and Greenhouse Gases From Natural Gas Combustion*, Tables 1.4-1 and 2 (July 1998). The emission factor from AP-42 was adjusted to the actual Btu content of the gas as follows: AP-42 factor * (Actual Btu/Scf) / 1020 Btu/Scf

Example calculations:

NOx lb/hr: (0.0012 MMscf/hr) * (108 lb/MMscf) = 0.13 lb/hr NOx

NOx ton/yr: (0.13 lb/hr) * (8,760 hr/yr) / (2,000 lb/ton) = 0.57 ton/yr NOx

CO lb/hr: (0.0012 MMscf/hr) * (91 lb/MMscf) = 0.11 lb/hr CO

CO ton/yr: (0.11 lb/hr) * (8,760 hr/yr) / (2,000 lb/ton) = 0.48 ton/yr CO

VOC lb/hr: (0.0012 MMscf/hr) * (5.9 lb/MMscf) = 0.01 lb/hr CO

VOC ton/yr: (0.01 lb/hr) * (8,760 hr/yr) / (2,000 lb/ton) = 0.03 ton/yr VOC

PM10 lb/hr: (0.0012 MMscf/hr) * (8.2 lb/MMscf) = 0.01 lb/hr PM10

PM10 ton/yr: (0.01 lb/hr) * (8,760 hr/yr) / (2,000 lb/ton) = 0.04 ton/yr PM10

SO2 lb/hr: (0.0012 MMscf/hr) * (0.6 lb/MMscf) = 0.001 lb/hr SO2

SO2 ton/yr: (0.001 lb/hr) * (8,760 hr/yr) / (2,000 lb/ton) = 0.003 ton/yr SO2

Northern Border Pipeline Company
Compressor Station No. 6 (Glen Ullin, North Dakota)
Permit No. T5-O93003
Title V Renewal Application
HE2 Hazardous Air Pollutant Calculations

Emission Unit ID: HE2 (HE2 is an insignificant activity.)
Description: Hydronic Boiler
Max. Heat Input: 1.336 million British thermal units per hour (MMBtu/hr) (HHV)
Heating Value: 1,099.78 British thermal units per standard cubic foot (Btu/scf)
Fuel Usage: 0.0012 million standard cubic feet per hour (MMscf/hr)
Fuel Type: Natural Gas
Controls: None
Conversion: 2,000 lb/ton
Conversion: 8,760 hours per year

Pollutant	CAS Number	AP-42 Emission Factor lb/MMscf	Site Emission Factor lb/MMscf	Emissions (lb/hr)	Emissions (ton/yr)
Acenaphthene	83-32-9	1.80E-06	1.94E-06	2.36E-09	1.03E-08
Acenaphthylene	208-96-8	1.80E-06	1.94E-06	2.36E-09	1.03E-08
Acetaldehyde	75-07-0	-	-	-	-
Acrolein	107-02-8	-	-	-	-
Anthracene	120-12-7	2.40E-06	2.59E-06	3.14E-09	1.38E-08
Arsenic	7440-38-2	2.00E-04	2.16E-04	2.62E-07	1.15E-06
Benzene	71-43-2	2.10E-03	2.26E-03	2.75E-06	1.20E-05
Benzo(a)anthracene	56-55-3	1.80E-06	1.94E-06	2.36E-09	1.03E-08
Benzo(a)pyrene	50-32-8	1.20E-06	1.29E-06	1.57E-09	6.88E-09
Benzo(b)fluoranthene	205-99-2	1.80E-06	1.94E-06	2.36E-09	1.03E-08
Benzo(e)pyrene	192-97-2	-	-	-	-
Benzo(g,h,i)perylene	191-24-2	1.20E-06	1.29E-06	1.57E-09	6.88E-09
Benzo(k)fluoranthene	207-08-9	1.80E-06	1.94E-06	2.36E-09	1.03E-08
Beryllium	7440-41-7	1.20E-05	1.29E-05	1.57E-08	6.88E-08
Biphenyl	92-52-4	-	-	-	-
1,3-Butadiene	106-99-0	-	-	-	-
Cadmium	7440-43-9	1.10E-03	1.19E-03	1.44E-06	6.31E-06
Carbon Tetrachloride	56-23-5	-	-	-	-
Chlorobenzene	108-90-7	-	-	-	-
Chloroform	67-66-3	-	-	-	-
Chromium	7440-47-3	1.40E-03	1.51E-03	1.83E-06	8.03E-06
Chrysene	218-01-9	1.80E-06	1.94E-06	2.36E-09	1.03E-08
Cobalt	7440-48-4	8.40E-05	9.06E-05	1.10E-07	4.82E-07
1,3-Dichloropropene	53-70-3	-	-	-	-
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	1.29E-06	1.57E-09	6.88E-09
Dichlorobenzene	106-46-7	1.20E-03	1.29E-03	1.57E-06	6.88E-06
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	1.73E-05	2.10E-08	9.18E-08
Ethylbenzene	100-41-4	-	-	-	-
Ethylene Dibromide	106-93-4	-	-	-	-
Fluoranthene	206-44-0	3.00E-06	3.23E-06	3.93E-09	1.72E-08
Fluorene	86-73-7	2.80E-06	3.02E-06	3.67E-09	1.61E-08
Formaldehyde	50-00-0	7.50E-02	8.09E-02	9.82E-05	4.30E-04
Hexane	110-54-3	1.80E+00	1.94E+00	2.36E-03	1.03E-02
Indeno(1,2,3-c,d)pyrene	193-39-5	1.80E-06	1.94E-06	2.36E-09	1.03E-08
Manganese	7439-96-5	3.80E-04	4.10E-04	4.98E-07	2.18E-06
Mercury	7439-97-6	2.60E-04	2.80E-04	3.41E-07	1.49E-06
2-Methylnaphthalene	91-57-6	2.40E-05	2.59E-05	3.14E-08	1.38E-07
3-Methylchloranthrene	56-49-5	1.80E-06	1.94E-06	2.36E-09	1.03E-08
Methanol	67-56-1	-	-	-	-
Methylene Chloride	75-09-2	-	-	-	-
Naphthalene	91-20-3	6.10E-04	6.58E-04	7.99E-07	3.50E-06
Nickel	7440-02-0	2.10E-03	2.26E-03	2.75E-06	1.20E-05
Phenol	108-95-2	-	-	-	-
PAH	85-01-8	-	-	-	-
Perylene	108-95-2	-	-	-	-
Phenanathrene	85-01-8	1.70E-05	1.83E-05	2.23E-08	9.75E-08
Propylene	129-00-0	-	-	-	-
Propylene Oxide	198-55-0	-	-	-	-
Pyrene	129-00-0	5.00E-06	5.39E-06	6.55E-09	2.87E-08
Selenium	7782-49-2	2.40E-05	2.59E-05	3.14E-08	1.38E-07
Styrene	100-42-5	-	-	-	-
Toluene	108-88-3	3.40E-03	3.67E-03	4.45E-06	1.95E-05
Tetrachloroethane	79-34-5	-	-	-	-
1,1,2,2-Tetrachloroethane	79-34-5	-	-	-	-
1,1,2-Trichloroethane	79-00-5	-	-	-	-
2,2,4-Trimethylpentane	540-84-1	-	-	-	-
Vinyl Chloride	75-01-4	-	-	-	-
Xylene	108-38-3	-	-	-	-
Total HAPs				**0.0025**	**0.0108**

The emission factors are based on AP-42, *Emission Factors for Speciated Organic Compounds From Natural Gas Combustion*, Tables 1.4-3 (July 1998) and *Emission Factors for Metals From Natural Gas Combustion*, Table 1.4-4 (July 1998). *The emission factor from AP-42 was adjusted to the actual Btu content of the gas as follows: AP-42 factor * (Actual Btu/scf) / 1020 Btu/scf.*

Example Calculations:

Hexane lb/hr: (1.94 lb/MMscf) * (0.0012 MMscf/hr) = 0.002 lb/hr Hexane

Hexane ton/yr: (0.002 lb/hr) * (8,760 hr/yr) / (2,000 lb/ton) = 0.0103 ton/yr Hexane

Northern Border Pipeline Company
Compressor Station No. 6 (Glen Ullin, North Dakota)
Permit No. T5-O93003
Title V Renewal Application
Site Greenhouse Gas Pollutant Potential-To-Emit Summary

Site Greenhouse Gas Pollutant Emission Summary							
Unit	CO_2 (tpy)	CO_2e (tpy)	Methane (tpy)	CO_2e (tpy)	N_2O (tpy)	CO_2e (tpy)	Total CO_2e (tpy)
CE1	162,418	162,418	3.06	76.53	0.31	91.22	162,586
EG1	2,772	2,772	0.05	1.31	0.01	1.56	2,775
HE2	685	685	0.01	0.32	0.00	0.38	685
TOTAL	**165,874**	**165,874**	**3.13**	**78.15**	**0.31**	**93.16**	**166,046**

Northern Border Pipeline Company
Compressor Station No. 6 (Glen Ullin, North Dakota)
Permit No. T5-O93003
Title V Renewal Application
CE1 Greenhouse Gas Pollutant Calculations

Emission Unit ID: CE1
Description: Cooper-Rolls Coberra 6562-DLE Compressor Turbine
Rating: 38,000 horsepower (ISO)
Max. Heat Input: 317 million British thermal units per hour (MMBtu/hr)
Fuel Type: Natural Gas
Controls: Dry low NOx combustion
Conversion: 2,000 lb/ton
Conversion: 8,760 hours per year

Pollutant	Emission Factor[a]	Emission Factor Units	Global Warming Potential	Emissions		
				(lb/hr)	(ton/yr)	(ton/yr CO_2e^b)
CO_2	116.98	lb/MMBtu	1	37,081.8	162,418	162,418
Methane	2.20E-03	lb/MMBtu	25	0.70	3.061	76.526
N_2O	2.20E-04	lb/MMBtu	298	0.07	0.306	91.219

[a] CO_2 emission factor based on Table C-1 to Subpart C of 40 CFR 98 and
CH_4 and N_2O emission factors are based on Table C-2 to Subpart C of 40 CFR 98.
[b] Global warming potential or CO_2e is based on Table A-1 to Subpart A of 40 CFR 98.

Example calculations:

CO_2 ton/yr: (116.98 lb/MMBtu) * (317 MMBtu/hr)*(8,760hours/year / (2,000 lb/ton) = 162,418 ton/yr CO2

CO_2e ton/yr: (162,418 ton/yr) * (1 GWP) = 162,418 ton/yr CO2e

Methane ton/yr: (0.00220 lb/MMBtu) * (317 MMBtu/hr)*(8,760hours/year / (2,000 lb/ton) = 3.061 ton/yr Methane

CO_2e ton/yr: (3.061 ton/yr) * (25 GWP) = 76.526 ton/yr CO2e

Northern Border Pipeline Company
Compressor Station No. 6 (Glen Ullin, North Dakota)
Permit No. T5-O93003
Title V Renewal Application
EG1 Greenhouse Gas Pollutant Calculations

Emission Unit ID: EG1
Description: Caterpillar G3412 SITA
Rating: 448 kilowatts (kW)
Rating: 600 horsepower
Max. Heat Input: 5.41 million British thermal units per hour (MMBtu/hr)
Fuel Type: Natural Gas
Controls: None
Conversion: 2,000 lb/ton
Conversion: 500 hours per year

Pollutant	Emission Factor[a]	Emission Factor Units	Global Warming Potential	Emissions		
				(lb/hr)	(ton/yr)	(ton/yr CO_2e^b)
CO_2	116.98	lb/MMBtu	1	632.8	2,772	2,772
Methane	2.20E-03	lb/MMBtu	25	0.01	0.052	1.306
N_2O	2.20E-04	lb/MMBtu	298	0.00	0.005	1.557

[a] CO_2 emission factor based on Table C-1 to Subpart C of 40 CFR 98,
Methane and N_2O emission factor is based on Table C-2 to Subpart C of 40 CFR 98.
[b] Global warming potential or CO_2e is based on Table A-1 to Subpart A of 40 CFR 98.

Example calculations:

CO_2 ton/yr: (116.98 lb/MMBtu) * (5 MMBtu/hr)*(500hours/year / (2,000 lb/ton) = 2,772 ton/yr CO2

CO_2e ton/yr: (2,772 ton/yr) * (1 GWP) = 2,772 ton/yr CO2e

Methane ton/yr: (0.00220 lb/MMBtu) * (5 MMBtu/hr)*(500hours/year / (2,000 lb/ton) = 0.052 ton/yr Methane

CO_2e ton/yr: (0.052 ton/yr) * (25 GWP) = 1.306 ton/yr CO2e

Northern Border Pipeline Company
Compressor Station No. 6 (Glen Ullin, North Dakota)
Permit No. T5-O93003
Title V Renewal Application
HE2 Greenhouse Gas Pollutant Calculations

Emission Unit ID: HE2 (HE2 is an insignificant activity.)
Description: Hydronic Boiler
Max. Heat Input: 1.336 million British thermal units per hour (MMBtu/hr)
Fuel Type: Natural Gas
Controls: None
Conversion: 2,000 lb/ton
Conversion: 8,760 hours per year

Pollutant	Emission Factor[a]	Emission Factor Units	Global Warming Potential	Emissions		
				(lb/hr)	(ton/yr)	(ton/yr CO_2e^b)
CO_2	116.98	lb/MMBtu	1	156.3	685	685
Methane	2.20E-03	lb/MMBtu	25	0.00	0.013	0.323
N_2O	2.20E-04	lb/MMBtu	298	0.00	0.001	0.384

[a] CO_2 emission factor based on Table C-1 to Subpart C of 40 CFR 98 and
CH_4 and N_2O emission factors are based on Table C-2 to Subpart C of 40 CFR 98.
[b] Global warming potential or CO_2e is based on Table A-1 to Subpart A of 40 CFR 98.

Example calculations:

CO_2 ton/yr: (116.98 lb/MMBtu) * (1 MMBtu/hr)*(8,760hours/year / (2,000 lb/ton) = 685 ton/yr CO2

CO_2e ton/yr: (685 ton/yr) * (1 GWP) = 685 ton/yr CO2e

Methane ton/yr: (0.00220 lb/MMBtu) * (1 MMBtu/hr)*(8,760hours/year / (2,000 lb/ton) = 0.013 ton/yr Methane

CO_2e ton/yr: (0.013 ton/yr) * (25 GWP) = 0.323 ton/yr CO2e

Attachment 3

Typical NBPL Gas Composition VOC Content

Calculate MW and BTU Content of Fuel Gas

	mole %	MW	lb/mole	BTU/Scf HHV	BTU/Scf LHV	wt%	VOC wt%
C1	82.7076	16.043	13.26878027	837.2490348	751.8947916	71.20010754	
C2	13.3627	30.069	4.018030263	237.0275726	216.1817606	21.56069971	
C3	0.8091	44.096	0.356780736	20.405502	18.7379469	1.914480929	1.914480929
iC4	0.0177	58.123	0.010287771	0.5769138	0.531177	0.055204049	0.055204049
nC4	0.0304	58.123	0.017669392	0.9940496	0.915192	0.094813735	0.094813735
iC5	0.0021	72.151	0.001515171	0.0842142	0.0776559	0.008130388	0.008130388
nC5	0.0020	72.151	0.00144302	0.08036	0.074136	0.007743227	0.007743227
C6+	0.0006	86.178	0.000517068	0.0308472	0.0264234	0.00277458	0.00277458
N2	1.9975	28.013	0.559559675	0	0	3.002590157	
CO2	0.9052	44.01	0.39837852	0	0	2.137694113	
H2	0.1457	2.016	0.002937312	0.47228655	0.39899945	0.015761579	
He	0.0198	4	0.000792	0	0	0.004249862	
	100.00		18.6358992	1096.920781	988.8380829	100	2.083146909
			AGA Real Heating Value	**1099.783744**			